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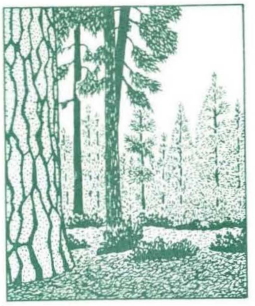
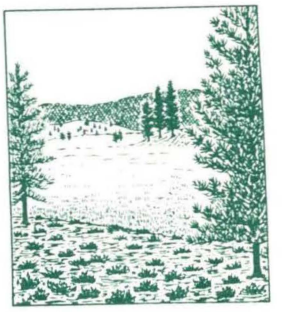


FOREST RESEARCH NOTES
CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
KEITH ARNOLD, DIRECTOR

U.S. DEPARTMENT OF AGRICULTURE – FOREST SERVICE



No. 135

March 1958

A CALIFORNIA PLANTING OF PROGENIES OF "ELITE" AND "NON-ELITE" PINUS RADIATA FROM AUSTRALIA

F. I. Righter and R. Z. Callaham, Geneticists
Institute of Forest Genetics

Progenies derived from two "elite" and three "non-elite" Australian Monterey pines (Pinus radiata D. Don) have been growing in California for the past 5 years. In the nursery bed one of the "elite" progenies grew significantly more in height than all of the other progenies. Now, after five full growing seasons, this progeny is slightly shorter than all of the others. At the present time there is no evidence that the two outstanding phenotypes growing in Australia produce genetically superior wind-pollinated progenies for California planting.

Seed for this study was provided by the Forestry Commission of New South Wales, Australia. Lots of wind-pollinated seed were obtained from each of five trees growing in the Billapaloola Forest in the southern part of the State. Two of the trees had been classified as "elite," primarily on the bases of superior height and diameter growth and of height to the first live limb (Table 1). All of the trees had been planted in 1932 and high-pruned in 1947-48. These lots of seed were collected in 1952.

The Experiment

A progeny test with these seeds was started in 1953 at the Institute of Forest Genetics. The size of seed for each lot was measured as the cubic centimeter volume per hundred seeds. Then each lot was stratified in moist sand at 5° C. for 2 months. All of the seeds were removed from stratification and sown in the nursery on the same day. Sowing followed a randomized block design. In each block 10 seeds of each progeny were sown in a row. Spacing in the nursery bed was 6 x 6 inches. Both the number of seeds germinated at 20, 23, 28, and 34 days after sowing and the tree heights at the end of the first growing season were recorded.

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Six of the original 15 blocks of seedlings were outplanted as bare-root stock in February 1954. The planting site was a grassy west-facing slope overlooking San Francisco Bay near the fog-shrouded summit of the Berkeley Hills, elevation 1,000 feet. Despite early damage by pocket gophers, more than 80 percent of the trees survived to the fall of 1957, when we measured tree heights (Table 1).

Results

After 5 growing seasons the average progeny heights were about equal (Table 1). No significant differences between progeny means were found. In fact, the significant differences in height found after the first growing season had been completely reversed. The best progeny after 1 year was the poorest after 5, and the poorest progeny at the beginning had improved considerably in later growth. Most surprising is the fact that both the tallest and shortest progenies after 1 year were from the two "elite" trees, perhaps because the lots of seed from which they grew were the largest and smallest.1/

These trees are just entering their period of most rapid growth. Perhaps more promising results will be forthcoming from future measurements. The trees also soon will be old enough for evaluations of stem form and branching habits for which the parents were rated.

1/ Righter, F. I. Pinus: The relationship of seed size and seedling size to inherent vigor. Jour. Forestry 43(2):131-137, illus. 1945.

Table 1.--Characteristics of Australian Pinus radiata trees, their seed, and their progenies grown in California

Parent tree	Height		Diameter	Seed		Progeny		
	Total	To 1st live limb	breast height	Volume of 100	Time to germinate	Height 1-year	Height 5-year	Survival 5-year
	ft.		in.	cc.	days	ft.		percent
Elite 1	93	48	14.5	5.4	1/ 22.9	3/ 0.66	5.40	82
Elite 2	89	37	13.8	7.5	2/ 23.9	4/ 0.81	5.21	97
Non-elite 1	79	36	8.7	7.0	2/ 23.5	0.71	5.34	82
Non-elite 2	77	30	10.5	6.9	26.0	0.73	5.47	90
Non-elite 3	67	16	7.8	6.3	2/ 24.1	0.75	5.41	83

1/ Germination significantly sooner than "non-elites" 2 and 3

2/ Germination significantly sooner than "non-elite" 2

3/ Height significantly poorer than all others

4/ Height significantly greater than all others

CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
FORESTRY BUILDING, UNIVERSITY OF CALIFORNIA
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